

REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

Upon entry of this Amendment, claims 1 and 3-4 are pending in the application. In response to the Office Action (Paper No. 7), Applicant respectfully submits the pending claims define patentable subject matter.

I. Preliminary Matters

The specification is objected to because the Examiner maintains that the acronym “PFPE” needs to be defined. By this Amendment, Applicant has amended the specification to indicate that “PFPE” is perfluoropolyether. Accordingly, the Examiner is requested to remove the objection to the specification.

II. Rejections Under 35 U.S.C. § 112

Claim 4 is rejected under 35 U.S.C. as being indefinite because the Examiner maintains that “it is unclear whether use or apparatus is being claimed.” By this Amendment, Applicant has amended claim 4 to improve clarity with regards to an apparatus claim format. Accordingly, the Examiner is requested to remove the § 112, second paragraph, rejection.

Claims 1, 3 and 4 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement because the Examiner maintains that the phrase “a

compound of carbon and fluorine” broadly reads on compounds other than the disclosed Turcite.¹ Further, claims 1, 3 and 4 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement because the Examiner maintains the specification does not provide enablement for all compounds containing carbon and fluorine. By this Amendment, Applicant has amended claims 1 and 4 to change to the phrase “compound of carbon and fluorine” to “perfluoropolyether (PFPE) resin”.² Accordingly, the Examiner is requested to remove the § 112, first paragraph, rejections.

III. Prior Art Rejections

A. The Present Invention

The present invention is directed to a surface treatment method and an electrode for the surface treatment method. As shown in Figure 1, a workpiece 100 is disposed on a work stand 2 which is provided inside a working bath 1 filled with a working liquid. A discharge electrode 3 is coupled to a power source 4 for applying a discharge voltage between the discharge electrode 3 and the workpiece 100 under the control of a control circuit 6.

The discharge electrode 3 comprises a material having solid lubricant effect, such as molybdenum. Discharge in a pulse form is generated between the discharge electrode 3 and the

¹ Claims 1 and 4 were amended in the Amendment filed February 7, 2003 to change the trademark/tradename “turbite” to “a compound of carbon and fluorine”.

² The specification (p. 9, lines 5-11) states that “Examples of the above-mentioned material having self-lubricity (solid lubricant material) include ... turbite, which is a compound of carbon and fluorine (PFPE resin).”

surface to be treated of the workpiece 100. The working liquid is a liquid, such as tap water, treated water or pure water, which does not include carbon components.

In operation, material consumed or melted from the discharge electrode 3, generated by the electric discharge energy based on the pulse form discharge, adheres to and is deposited onto the surface of the workpiece 100 thereby forming a coat having a lubricant effect on the surface of the workpiece 100. Since water is used as the working liquid, the electrode material having solid lubricant effect adheres and deposits onto the surface to be treated, without conversion of the electrode material to a compound with carbon. As a result, a lubricant coat (solid lubricant film) can be formed on the surface to be treated.

B. Double Patenting Rejection

Claims 1 and 3 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Moro et al. (U.S. Patent No. 6,314,778; hereafter “Moro”).³ Along with this Amendment, Applicant is submitting a terminal disclaimer with regards to the Moro patent. Accordingly, the Examiner is requested to remove the double patenting rejection.

³ Although the Office Action indicates that double patenting rejection is provisional, the conflicting claims of the Moro patent have indeed been patented. Therefore, the double patenting rejection should not be considered provisional.

C. Rejection of claims 1, 3 and 4 under 35 U.S.C. § 103(a) in view of Moro

Claims 1, 3 and 4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Moro (U.S. Patent No. 6,314,778).⁴ Applicant submits the Moro patent and the present application were, at the time the present invention was made, commonly owned by, or subject to an obligation of assignment to Mitsubishi Denki Kabushiki Kaisha.⁵ Accordingly, the Examiner is requested to withdraw the § 103 rejection based on Moro since the patent is now disqualified as prior art.

D. Rejection of claims 1, 3 and 4 in view of Nishimuro, Urashiro and Saito

Claims 1, 3 and 4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishimuro et al. (U.S. Patent No. 5,108,555; hereafter “Nishimuro”) in view of Urashiro et al. (JP 6-182626; hereafter “Urashiro”) and Saito et al. (JP 5-148615).

With regards to independent claims 1 and 4, the Examiner asserts that Nishimuro discloses “a discharge electrode to be used for electrical discharge machining, via molding powders of

⁴ The Moro patent is prior art under 35 U.S.C. § 102(e) since the Moro patent did not issue more than one year prior to the U.S. filing date of the present application.

⁵ Pursuant to §4807 of the new American Inventors Protection Act of 1999, subject matter which was prior art under former 35 U.S.C. §103(c) via §102(e) is disqualified as prior art against a claimed invention if that subject matter and the claimed invention “were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.” The change to §103(c) applies to any patent application filed on or after the date of enactment of November 29, 1999. Applications and references will be considered by the Patent Office to be owned by, or subject to an obligation of assignment to the same person, at the time the invention was made, if the applicant(s) or an attorney or agent of record makes a statement to the effect that the application and the reference were, at the time the invention was made, owned by, or subject to an obligation of assignment to, the same person (MPEP 706.02(1)(2)(II)).

gypsum dihydrate and conductive metals such as Ti, Ni, Pb, etc.” Further, the Examiner contends that Urashiro discloses pulsed discharging with discharge electrodes in water, and Saito discloses compressive molding of conductive materials for discharge electrodes.

Applicant respectfully submits that the amended claims would not have been rendered obvious in view of the combination of Nishimuro, Urashiro and Saito because the combined references do not teach or suggest an electrode comprising at least one of molybdenum disulfide, boron nitride, tungsten disulfide, gold, indium, and a perfluoropolyether (PFPE) resin, as claimed. That is, the combined references do not teach or suggest an electrode comprising the claimed electrode materials having solid lubricant effect or a deposited layer having a lubricant effect.

Accordingly, Applicant respectfully submits the claimed invention should be allowable over the combination of Nishimuro, Urashiro and Saito because the combined references do not teach or suggest all of the features of the claims.

E. Rejection of claim 4 in view of Kamata or JP 63-5956

Claim 4 is rejected under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as being unpatentable over Kamata et al. (U.S. Patent No. 4,520,087; hereafter “Kamata”) or JP 63-5956.

With regards to claim 4, the Examiner appears to be disregarding the claimed “working liquid containing no carbon components.” In particular, the Examiner asserts “[t]he liquid is something employed in the apparatus or with the electrode (i.e., method limitations), so it is uncertain how much or little the working liquid feature does or should limit this claim, if it is

considered an apparatus.” However, as discussed above, claim 4 has been amended to more clearly recite the claimed apparatus such that the Examiner must consider all limitations recited therein.

With regards to Kamata, Applicant respectfully submits that the cited reference is not relevant to the claimed invention. That is, Kamata is directed to a divalent silver oxide cell (battery) such that the cited reference does not teach or suggest the claimed electrode for discharge surface treatment and/or the claimed working liquid in which the electrode carries out a surface treatment using electric discharge.

With regards to JP 63-5956, Applicant respectfully submits the cited reference does not teach or suggest the claimed working liquid. That is, although JP 63-5956 9 (abstract) appears to disclose an electrode including boron nitride as a lubricant, the cited reference teaches that the electrode is utilized for electrodischarge recording (i.e., printing) on paper. Accordingly, one of ordinary skill in the art would not have been motivated to utilize the electrode in a working liquid.

Accordingly, Applicant respectfully submits the claimed invention should be allowable over Kamata and JP 63-5956 because the cited references do not teach or suggest all of the features of the claims.

IV. Conclusion

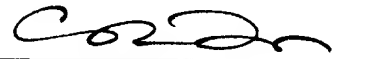
In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Patent Application No. 09/822,025

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Christopher R. Lipp
Registration No. 41,157

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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